Electron Cloud Studies Using CERN Strip Detectors

Main goal:
installation of a set of detectors to compare EC build up in the SPS and RHIC with protons using the same types of detectors in field free and dipole field conditions -> code benchmarking

In particular study the filling pattern effect and electron survivors in the gap (depending on gap length).

Ask: 2x 6 hour shifts, total of 12 hours of p-beam time in FY06

Detectors/HW

11 o'clock side of IR12 , 2m upstream of jet:

- two dipoles
- strip detector (x100 more sensitivity!)
- shielded pick-up
- charge collectors (ions or electrons)
- retarding field detectors (RFD) -> enegy distribution
- residual gas analyzer -> vacuum behavior
- Unshielded pick-up for triggering

Advantages

- Beam conditions and multipacting probability
- options of one or two circulating beams
- smaller bunch spacing
- pressure increase already observed
- some existing RHIC diagnostics
- “easier” installation (no interference with other beam pipe)
- service building inside the ring with available rack space
- smaller distance for cables
- low radiation area with an alcove for in-tunnel electronics
- enough space for two dipoles
- 5m pipe can be replaced, useful length is 3 m
- connecting pipes (NEG coated) will be equipped with pressure gauges and charge collectors
- solenoid wrapping to avoid EC build-up if not in use

CERN resources

The following resources have been identified in the AT and TS Departments of CERN for the installation of the strip and retarding field detectors in the room temperature parts of RHIC. Their availability has to be approved.

Activity	Resources	Costs
Feasibility studies (already started)	1 m/month	
Collaboration supervision (travel and local expenses)	1 m/month	5 kCHF
Mechanical Design (AT/VAC Technician)	3 m/month	
Mechanical Design (TS/MME Designer)		36 kCHF
Manufacturing of the detectors		25 kCHF
Technical support for the detectors assembly	1 m/month	
Control and acquisition system for the detectors		10 kCHF
Installation and commissioning in RHIC machine	0.8 m/month	
Travel and local expenses		8 kCHF
Operation of the detectors	0.5 m/month	
Travel and local expenses		5 kCHF
Totals	6.3 m/month	89 kCHF

The resources from RHIC are not quantified in this document and concern the following activities:

- Follow-up of the collaboration and of the design aspects
- Cabling and water connections costs for the tunnel installation
- Installation costs
- Assistance during the operation of the detectors

Proposed Schedule

The following schedule is proposed for this Collaboration:

Date	Action
September 2004	Approval by CERN Management
	Proposal at the RHIC Executive Board
October 2004	Approval by BNL Management
December 2004	Design Review at RHIC
January 2005	Final approval of the drawings (CERN/RHIC)
	Shipping of the magnets and their supports (if required)
May 2005	Manufacturing of the detectors completed
June 2005	Shipping of the detectors and control systems
August 2005	Installation and commissioning in RHIC machine

Ready for FY06 run!